

# **ATTACHMENT A**

**UNITED STATES DISTRICT COURT  
FOR THE EASTERN DISTRICT OF VIRGINIA  
RICHMOND DIVISION**

UNITED STATES OF AMERICA

v.

OKELLO T. CHATRIE,

*Defendant.*

Case No. 3:19-cr-00130-MHL

**DECLARATION OF MARLO MCGRUFF**

I, Marlo McGriff, respectfully submit this declaration in regard to the above-captioned matter. I make this declaration based on my knowledge of the facts stated herein.

1. I am a Location History Product Manager at Google, where my responsibilities include the Location History product. I joined Google in 2011 and have been in my current role since 2016.

2. I lead the cross-functional Location History team and am the overall Location History lead, setting the near-term goals and long-term strategy for the product.

**I. Google Location History**

3. Some Google services require a user to have a Google account before she can use the service at all, like Gmail. Other services do not require a user to have an account, but offer additional functionality that is only available to Google account holders, like Maps and Search.

4. Google Location History (“LH”) is a service that Google account holders may choose to use to keep track of locations they have visited while in possession of their compatible

mobile devices. LH is not available to users who do not have a Google account. Users must explicitly opt in to the service.<sup>1</sup>

5. Google users can visualize their LH data through the “Timeline” feature of Google Maps, which operates as a journal that Google users can choose to use to create, edit, and store a record of their movements and travels. The Timeline feature processes the user’s LH data to infer semantic location information such as place visits (*e.g.*, visit to a ski resort), activities (*e.g.*, driving), and paths between place visits (*e.g.*, driving from hotel to ski resort), which is then displayed to the user in her Timeline. LH and the Timeline feature thus allow a user to see where she has traveled with her device and when over a given period.

6. Users who opt into and use LH can access other benefits on their Google devices or applications as well. For instance, they can obtain personalized maps or recommendations based on places they have visited, get help finding their phones, and receive real-time traffic updates about their commutes.

7. For Google LH to function and save information about a user’s location, the user must take several steps—some tied to her mobile device, some tied to her Google account.<sup>2</sup> First, the user must ensure that the device-location setting on her mobile device is turned on. When the device-location setting is activated, the mobile device automatically detects its own location, which the device ascertains based on GPS and Bluetooth signals, Wi-Fi connections, and cellular networks. Android users can also tailor their devices’ location-reporting settings, controlling which sources of information (*e.g.*, GPS, cellular, or Wi-Fi) the device may use to

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<sup>1</sup> See Google, *Manage Your Location History*, <https://support.google.com/accounts/answer/3118687?hl=en> (visited Feb. 27, 2020).

<sup>2</sup> See generally *id.*; Google Privacy & Terms, *How is location saved in my Google Account?*, <https://policies.google.com/technologies/location-data#how-save> (visited Feb. 27, 2020).

determine location, and which applications can access location data. On iOS devices, the user must further configure her mobile device to share location information by granting the required device-level application location permission.

8. However, merely taking the steps described above—steps that are tied to a mobile device—does not on its own enable LH for a user’s account. Google does not save LH information about where a particular mobile device has been to a user’s account—even when the device-location feature is turned on and (for iOS) the required device-level application location permissions have been granted—unless the user has also taken additional specific steps tied to her account.

9. For one, the user must opt into LH in her account settings and enable “Location Reporting”—a subsetting within LH—for each particular device on which she wants to use LH. And to actually record and save LH data, the user must then sign into her Google account on her device and travel with that device. A single Google account can be associated with multiple devices, and the “Location Reporting” feature within LH allows users to select the specific devices on which they wish to enable LH.

10. In sum, LH functions and saves a record of the user’s travels only when the user opts into LH as a setting on her Google account, enables the “Location Reporting” feature for at least one mobile device, enables the device-location setting on that mobile device (and for iOS devices provides the required device-level application location permission), powers on and signs into her Google account on that device, and then travels with it.

11. When a user takes the above-mentioned steps, the resulting data is communicated to Google for processing and storage. Google stores this data in a database internally referred to as “Sensorvault.” Only LH information is stored in Sensorvault.

12. LH information may be considerably more precise than other kinds of location data, including cell-site location information (“CSLI”). That is because, as a technological matter, a mobile device’s location-reporting feature can use multiple inputs in estimating the device’s location. Those inputs could include GPS signals (*i.e.*, radio waves detected by a receiver in the mobile device from orbiting geolocation satellites) or signals from nearby Wi-Fi networks, Bluetooth beacons, or cell towers. Combined, these inputs (when the user enables them) can be capable of estimating a device’s location to a higher degree of accuracy and precision than is typical of CSLI. For example, I understand that when a strong GPS signal is available, a device’s location can be estimated within approximately twenty meters or less.

13. In 2019, the majority of Google users worldwide did not have LH enabled on their account. While a more precise percentage is difficult to calculate in part due to fluctuating numbers of users, in 2019, roughly one-third of active Google users (*i.e.*, numerous tens of millions of Google users) had LH enabled on their accounts.

14. Depending on a user's ads personalization setting, Google may use the semantic location information described in Paragraph 5 above (*e.g.*, place visits) that the Timeline feature infers from LH to show relevant ads to the user. For example, a user who regularly frequents ski resorts may later see an ad for ski equipment when watching a video on YouTube. Additionally, Google may also use the semantic location information that the Timeline feature infers from LH in an anonymized and aggregated manner to help advertisers measure how often an online ad campaign helps drive traffic to physical stores or properties. Google does not share LH or any other information identifying individual users with advertisers.<sup>3</sup> Additionally, at all times

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<sup>3</sup> See Google Privacy & Terms, *How is location used to show ads?*, <https://policies.google.com/technologies/location-data#show-ads> (visited Feb. 27, 2020).

relevant to this warrant, Google has not shared identified LH data with third parties except through legal process and has not monetized identified LH data.

15. Critically, as described in Google's Privacy Policy at <https://policies.google.com/technologies/retention>, a user remains in control of her LH data through her Timeline. She can review, edit, or delete her Timeline at will. By deleting Timeline entries, a user also deletes the underlying LH information. As such, the user could decide to keep LH information only for certain dates; she could delete all LH information except those associated with certain Timeline entries; she could instruct Google to automatically delete all LH information after a set period; or she could keep all LH information for future reference. When a user deletes data in her Google account, Google immediately starts the process of removing it from the product and our systems as described in Google's Privacy Policy, at <https://policies.google.com/technologies/retention>.

16. Google users may also opt into a separate service called Web & App Activity ("WAA"). If a user turns on the WAA setting in his or her Google account with the necessary app-level and device-level permissions (*e.g.*, if the device-location setting on the mobile device is active), some activities that the user engages in while logged into her account (for instance, Google searches) are saved to that account, so the user may have a more personalized experience. For example, she may experience faster searches and more helpful app and content recommendations, such as when a user sees her search automatically suggested based on past searches.<sup>4</sup> Some of these WAA entries can include location information, although the source of

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<sup>4</sup> See, *e.g.*, Google, *See & control your Web & App Activity*, <https://support.google.com/websearch/answer/54068?co=GENIE.Platform%3DAndroid&hl=en> (visited Feb. 27, 2020); Google Privacy & Terms, *How is location saved in my Google Account?, at Web & App Activity*, <https://policies.google.com/technologies/location-data#how-save> (visited Feb. 27, 2020).

the location information will vary depending on the activity, the device, and the user's other settings. LH and WAA are separate services that store data in separate databases, and there are no dependencies between LH and WAA. WAA data is not used to calculate the locations that are stored in LH, and completing a search across LH data does not search or draw on WAA data in any way.

17. Google Location Accuracy ("GLA") is a separate setting, which was formerly known as Google Location Services. It is available only on Android mobile devices. When the GLA setting is turned off, an Android device will use only GPS data to calculate its location. If a user has the GLA setting on, the Android's location services will use additional inputs, including Wi-Fi access points, mobile networks, and sensors, to estimate the device's location.<sup>5</sup> While location data may be periodically collected from devices with the GLA setting turned on and used in an anonymous way to improve location accuracy (*e.g.*, estimating the locations of WiFi access points and cell towers), that location data is not stored with user identifiers and is stored separately from the LH database and the WAA database.<sup>6</sup> As indicated, if a user has turned on GLA, then the device's location information that is sent to and stored in LH (if LH has been enabled) may be calculated using not only GPS-sourced data, but also Wi-Fi- or cell-sourced data from the GLA database. In other words, GLA data might be used by the device to calculate a location data point that is then stored in LH. But there are no other dependencies between GLA and LH. Completing a search across LH data does not search or draw on GLA data in any way—the databases are separate and do not interact beyond the initial location calculation.

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<sup>5</sup> See, *e.g.*, Google, *Manage your Android device's location settings*, <https://support.google.com/nexus/answer/3467281?hl=en> (visited Feb. 27, 2020).

<sup>6</sup> See, *e.g.*, Google Privacy & Terms, *How does Google know my location?*, at Google Location Services, <https://policies.google.com/technologies/location-data> (visited Feb. 27, 2020).

18. When GLA is turned on, the inputs used to calculate a user's estimated location can include WiFi access points. However, Google cannot reconstruct which WiFi access points were used to calculate a given LH data point. Although Google collects anonymized data in GLA that allows it to estimate the physical location of particular WiFi access points, and those WiFi access points in turn can be an input used to calculate a device's estimated location that is then stored in LH, Google does not know and cannot recreate which particular WiFi access points were used to calculate any particular LH data point. Google therefore cannot identify the physical location of the WiFi access points used to estimate a user's location coordinates stored in LH because it cannot determine which WiFi access points were used to estimate the user's location.

## **II. Google's Production of LH Information to Law Enforcement**

19. I understand that this case concerns a so-called "geofence" request, which seeks LH information for all Google users whose LH information indicates that their device may have been present in a specified geographic area during a certain window of time.

20. In practice, LH is the only form of location data Google maintains that Google believes to be responsive to a geofence request, and LH is the only form of location data that was produced to the government in this case. This is because at all times relevant to this case, Google has not stored any other location information in association with specific Google user accounts that is sufficiently granular to be responsive to and searchable for such a request. To be relevant and responsive to a geofence warrant, location data must be stored in association with a specific user's account and must be able to pinpoint a user's estimated location with enough precision to bring it within the radius described in a geofence warrant. Even though Google devices and applications might sometimes use or transmit information about a user's location to



Google while the device or application is in use, no such information other than LH is stored and searchable in association with specific user accounts at a level of precision sufficient to be searched and produced in response to a geofence warrant.

21. At all times relevant to this case, WAA did not store a user's location at a level of detail precise enough to be responsive to a geofence warrant. Stored WAA data reflects a device's location to an approximate area of at least one square kilometer; and, if there are fewer than 1000 users in one square kilometer, the area is even larger. WAA data was therefore too coarse to be responsive to the warrant in this case and was not searched or produced.

22. Google does not store GLA data in association with any particular Google account. GLA data therefore is not responsive to a typical geofence warrant and was not responsive or relevant to the warrant in this case and was not searched or produced.

23. LH information can be searched in response to a geofence request. To conduct that search, Google must search across *all* LH data to identify users with LH data during the relevant timeframe, and run a computation against every set of stored LH coordinates to determine which records match the geographic parameters in the warrant. Google does not know which users may have such saved LH data before conducting the search and running the computations.

24. The location data points reflected in LH are estimates based on multiple inputs, and therefore a user's actual location does not necessarily align perfectly with any one isolated LH data point. Each set of coordinates saved to a user's LH includes a value, measured in meters, that reflects Google's confidence in the saved coordinates. A value of 100 meters, for example, reflects Google's estimation that the user is likely located within a 100-meter radius of the saved coordinates based on a goal to generate a location radius that accurately captures

roughly 68% of users. In other words, if a user opens Google Maps and looks at the blue dot indicating Google's estimate of his or her location, Google's goal is that there will be an estimated 68% chance that the user is actually within the shaded circle surrounding that blue dot.

25. Notwithstanding the confidence interval described above, if a user's estimated location (*i.e.*, the stored coordinates in LH) falls within the radius of the geofence request, then Google treats that user as falling within the scope of the request, even if the shaded circle defined by the 68% confidence interval falls partly outside the radius of the geofence request. As a result, it is possible that when Google is compelled to return data in response to a geofence request, some of the users whose locations are estimated to be within the radius described in the warrant (and whose data is therefore included in a data production) were in fact located outside the radius. To provide information about that, Google includes in the production to the government a radius (expressed as a value in meters) around a user's estimated location that shows the range of location points around the stored LH coordinates that are believed to contain, with 68% probability, the user's actual location.

26. In contrast, the purposes for which Google designed LH do not depend on any individual stored LH data points. For instance, the Timeline feature combines and contextualizes numerous individual stored LH data points over periods of time into inferred semantic location information (*e.g.*, place visits) so that users may store and visualize their location and movements in a journal (*e.g.*, visiting a hotel, visiting a ski resort, and driving between that hotel and ski resort). Similarly, Google may use such inferred semantic place visits (not individual stored LH data points) for ads. LH is sufficiently precise and reliable for these purposes for which Google designed LH.

I declare under penalty of perjury that the foregoing is true and correct to the best of my

knowledge and belief.

Executed this 11<sup>th</sup> day of MAR 2020, in San Francisco.



Marlo McGriff